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Claims

1. A method for preparing a carrier (biochip) coated with biologically or chemically functional materials, which comprises the steps of:
   (a) providing a carrier having a surface which has photoactivatable groups,
   (b) activating the photoactivatable groups on at least one predetermined area of the carrier surface by location-specific exposure of the carrier using an illumination matrix which can be controlled to generate an optionally adjustable exposure pattern, the exposure of the carrier being monitored and, where appropriate, controlled by means of a light sensor matrix, in particular a CCD matrix,
   (c) location-specific binding of biologically or chemically functional materials or building blocks for such materials on at least one of the predetermined areas and
   (d) where appropriate, repeating the activation and binding steps on the same or/and different predetermined areas.

2. The method as claimed in claim 1,
characterized in that
electromagnetic radiation in the IR range, visible range, UV range or/and X-ray range is used for the exposure.

3. The method as claimed in claim 1 or 2,
characterized in that
the carrier is exposed to pulsating, coherent,

monochromatic, parallel radiation or/and to radiation which can be focused in different planes.

4. The method as claimed in any of the preceding claims,
characterized in that,
different predetermined areas are exposed parallel.

5. The method as claimed in any of claims 1 to 4,
characterized in that,
the illumination matrix used is a reflection matrix having a mirror arrangement deformable in a controlled way.

6. The method as claimed in any of claims 1 to 4,
characterized in that,
the reflection matrix used is a light modulator with viscoelastic control layers or a light modulator with micromechanical mirror arrays.

7. The method as claimed in any of claims 1 to 4,
characterized in that,
the illumination matrix used is a matrix arrangement which is prepared on a chip and which is composed of light sources, namely a laser array or/and a diode array.

8. The method as claimed in any of the preceding claims,
characterized in that,
an optically transparent carrier is used.

9. The method as claimed in any of the preceding claims,
characterized in that,

the carrier has a surface selected from semiconducting materials, for example silicon, germanium or gallium arsenide, glass, for example quartz glass, and plastics.

10. The method as claimed in any of the preceding claims,
characterized in that
the predetermined activated areas include an area of from 1 μm^2 to 1 cm^2, in particular 100 μm^2 to 1 mm^2.

11. The method as claimed in any of the preceding claims,
characterized in that
the predetermined activatable areas are surrounded by nonactivated or/and nonactivatable areas.

12. The method as claimed in claim 11,
characterized in that
the illumination matrix has a pattern inherent for the predetermined activatable areas.

13. The method as claimed in any of the preceding claims,
characterized in that
the biologically or chemically functional materials are selected from biological substances or materials reacting with biological substances.

14. The method as claimed in any of the preceding claims,
characterized in that
the biologically or chemically functional materials are selected from nucleic acids and nucleic acid building blocks, in particular nucleotides and oligonucleotides, nucleic acid

analogs such as PNA and building blocks thereof, peptides and proteins and building blocks thereof, in particular amino acids, saccharides, cells, subcellular preparations such as cell organelles or membrane preparations, viral particles, cell aggregates, allergens, pathogens, pharmacological active substances and diagnostic reagents.

15. The method as claimed in any of the preceding claims,
characterized in that
the biologically or chemically functional materials are synthesized on the carrier in two or more stages from monomeric or/and oligomeric building blocks.

16. The method as claimed in any of the preceding claims,
characterized in that
a substance library comprising a multiplicity of different biologically or chemically functional materials is generated on the carrier.

17. The method as claimed in any of the preceding claims,
characterized in that
activation of predetermined areas comprises cleaving a protective group off the carrier itself or off materials or building blocks thereof which are bound on said carrier.

18. The method as claimed in any of the preceding claims,
characterized in that
the exposure takes place at a rate of from 1/10000 to 1000, preferably 1/10 to 100 light patterns per second.

19. The method as claimed in any of the preceding claims,
characterized in that
the illumination matrix, carrier and sensor matrix form a transmitted-light arrangement.

20. The method as claimed in any of the preceding claims,
characterized in that
the illumination matrix, carrier and sensor matrix form a reflected-light arrangement.

21. The method as claimed in any of the preceding claims,
characterized in that
the carrier is precalibrated using the illumination matrix and sensor matrix.

22. The method as claimed in any of the preceding claims, which furthermore comprises removing, at least partially, materials synthesized on the carrier, in particular polymers such as nucleic acids, nucleic acid analogs and proteins.

23. The method as claimed in claim 22,
characterized in that
the materials in different areas are removed in successive steps and used as building blocks for further synthesis of polymers, in particular nucleic acid polymers.

24. The use of a controllable illumination matrix, in particular reflection matrix, in a light-emission detector for detecting the optical behavior of a 2- or 3-dimensional test area provided with biologically or chemically functional materials,

the test area being prepared in the light-emission detector.

25. The use as claimed in claim 24,
characterized in that
the test area is selected from coated carriers, smears, for example of cells or microbeads, and biological samples, for example tissue sections or cell arrays.

26. The use as claimed in either of claims 24 and 25 in connection with a light detection matrix, in particular a CCD matrix.

27. A method for preparing a carrier (biochip) coated with biologically or chemically functional materials, which comprises the steps of:
(a) providing a carrier having a surface which has photoactivatable groups,
(b) activating the photoactivatable groups on at least one predetermined area of the carrier surface by location-specific exposure of the carrier using a UV diode array or/and a UV laser array which can be controlled to generate an optionally adjustable exposure pattern,
(c) location-specific binding of biologically or chemically functional materials or building blocks for such materials on at least one of the predetermined areas and
(d) where appropriate, repeating the activation and binding steps on the same or/and different predetermined areas.